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10/772,104	02/04/2004	Scott Lewallen	2126-14-3	5058
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John M. Janway 3031 NW 64th Street Seattle, WA 98107			EIDE, HEIDI MARIE	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/772,104	Applicant(s) LEWALLEN ET AL.
	Examiner HEIDI M. BASHAW	Art Unit 3732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 25 April 2008.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-9, 12-22, 24, 26-28, 31-33, 36 and 47-71 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-9, 12-22, 24, 26-28, 31-33, 36 and 47-71 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____
- 5) Notice of Informal Patent Application
- 6) Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-9, 12-22, 24, 26 and 47-52 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Each of the independent claims have been amended to include the limitation of a processor, however, the originally filed specification only has support for a microprocessor. A processor is capable of being more than just a microprocessor, therefore this is considered new matter.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-7, 47-52 and 58-71 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant has amended the claims to include claim language which is not consistent with the disclosure and the other claims; therefore it is confusing as to what the applicant is trying to claim.

Examples of this inconsistent claim language are as follows: voltage signal and modified voltage signal.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 5-7, 47-48, 58-65 and 67-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. 5,017,134 (Saito) in view of Masreliez 5,759,159.

7. Saito teaches an apparatus to determine the proximity of a dental instrument to a tooth's apical foramen while the instrument is in the tooth's canal, the apparatus comprising a signal generator 11/12 coupleable to body tissue of a patient and to a dental instrument that is operable to remove tissue from a tooth of the patient, wherein while the signal generator is coupled to the body tissue and the instrument, the signal generator generates a voltage signal across the body tissue and the instrument and a processor 26 coupleable to the dental instrument an that while coupled to the dental instrument and while the instrument removes tissue from the patient's tooth, senses the voltage signal after the voltage signal has been modified by the impedance of the patient's body and compares the modified voltage signal to the voltage signal generated by the signal generator (col. 3, ll. 9-21, ll. 46-53). Saito further teaches the voltage signal includes an amplitude and a frequency and the processor compares the amplitude of the voltage signal generated by the signal generator to the amplitude of the

modified voltage signal (col. 4, ll. 53-68, col. 5, ll. 1-4). Saito also teaches in response to comparing the modified voltage signal to the voltage signal generated by the signal generator, the processor generates a proximity signal that represents the proximity of the dental instrument to the tooth's apical foramen, wherein the proximity signal is generated from an equation that is stored in the apparatus and executed by the processor that correlates to at least one signal comparison with a proximity of the dental instrument to the apical foramen (col. 5, ll. 35-42, 50-55). Saito teaches wherein the voltage signal consists essentially of a single frequency (col. 3, ll. 9-13) and wherein sensing the modified voltage signal includes amplifying the modified voltage signal (col. 3, ll. 14-15). Saito also teaches wherein indicating the proximity of the dental instrument of the apical foramen includes updating the proximity signal (col. 5, ll. 56-65). As to claims 47 and 69 Saito does not specifically teach the proximity signal is generated from a look-up table, however, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a look-up table in lieu of an arithmetic equation as values on the table would be defined by the equation. Saito does not teach the processor demodulates the modified voltage signal to isolate the modified voltage signal from the electrical noise generated by the dental instrument, an analog to digital converter that digitizes the modified voltage signal, the processor determines the phase of the modified voltage signal relative to the voltage signal generated by the signal generator and comparing the modified voltage signal and the phase signal includes comparing their amplitudes and phase. Masreliez teaches a processor which demodulates a signal to isolate the signal from the electrical noise generated by an

instrument (col. 4, ll. 45-46). Masreliez further teaches an analog to digital converter 70 and further teaches comparing the amplitudes and/or phases of the signal (see abstract, col. 2, ll. 13-24). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Saito in view of Masreliez in order to improve the accuracy of the measurement as taught by Masreliez (col. 2, ll. 20-23).

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. 5,017,134 (Saito) in view of Masreliez 5,759,159 as applied to claim 1 above, and further in view of Reifman et al. 6,425,875 (Reifman).

9. Saito in view of Masreliez teach the invention as discussed above, however, does not teach the apparatus further comprising a reference impedance coupled to the signal generator and the dental instrument such that the reference impedance and the dental instrument are arranged in series relative to each other, and the signal generator generates a voltage signal across the combination of reference impedance, the dental instrument and the body tissue, wherein the reference impedance is known. Reifman teaches a reference impedance coupled to the signal generator and the dental instrument such that the reference impedance and the dental instrument are arranged in series relative to each other, and the signal generator generates a voltage signal across the combination of reference impedance, the dental instrument and the body tissue, wherein the reference impedance is known (col. 6, ll. 1-22). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Saito in view of Masreliez further in view of Reifman in order to have a known variable in computing the proximity.

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10. Claims 49-52 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. 5,017,134 (Saito) in view of Masreliez 5,759,159 as applied to claim 1 above, and further in view of Silver et al. 6,356,350 (Silver).

11. Saito in view of Masreliez does not teach the processor executes a synchronous demodulation algorithm, a fast Fourier transform, a single frequency fast Fourier transform or a convolving algorithm to demodulate the modified voltage signal from electrical noise generated by the dental instrument. Silver teaches using a fast Fourier transform to demodulate a signal (col. 5, ll. 60-62). Applicant does not claim criticality as to the different methods of demodulating the signal; therefore it would have been an obvious matter of design choice to use any known mathematical method to demodulate the signal in order to obtain the most accurate result.

12. Claims 8-9, 12-14, 16, 18-22, 24 26-28, 31-33, 36, 53-54 and 56-57 rejected under 35 U.S.C. 103(a) as being unpatentable over Reifman et al. 6,425,875 (Reifman) in view of Masreliez 5,759,159.

13. Reifman teaches an apparatus to indicate the proximity of a dental instrument to a tooth's foramen while the instrument is in the tooth's root canal the apparatus comprising a first lead operable to couple the apparatus to a dental instrument 5 and including a second node, a second lead operable to couple the apparatus to body tissue of a patient and including a third node, wherein the body tissue has an impedance, a known reference impedance 21 coupled to the first lead such that while the first lead is coupled to the dental instrument and the second lead is coupled to the body tissue, the reference impedance, instrument and body tissue are arranged in series relative to each

other, a signal generator 3 coupled to the reference impedance and the second lead, wherein the coupling between the signal generator and the reference impedance includes a first node, the signal generator operable to generate a divider signal across the combination of the reference impedance, dental instrument and body tissue and wherein the reference impedance is operable to modify the divider signal (col. 6, ll. 1-13). Reifman further teaches processor 2 that includes a storage (col. 5, ll. 6-11) and the instrument is capable of removing tissue from the patients tooth and the processor samples a stimulation signal that includes the divider signal modified by the reference impedance and the body tissue's impedance and compares the stimulation signal to the divider signal (col. 5, ll. 31-39, col. 6, ll. 1-14), stores at least one lookup table that correlates at least one signal comparison with a proximity of the dental instrument to the apical foramen (col. 5, ll. 6-11) and generates a proximity signal from the lookup table and a proximity indicator that indicates the proximity of the dental instrument to the tooth's apical foramen (col. 6, ll. 10-22). Reifman further teaches the divider signal includes an amplitude and a frequency (col. 5, ll. 22-39), the reference impedance essentially consists of a resistive element and the reference impedance comprises a resistive and reactive element (col. 6, ll. 1-10) and the apparatus further including a signal conditioner wherein the signal conditioner includes an amplifier 7 coupled between the second node and the processor that amplifies the stimulation signal (col. 5, ll. 34-39). Reifman teaches the lookup table includes an empirical element derived from observation of the divider signal and the stimulation signal as a function of proximity of the dental instrument to the apical foramen in teeth other than teeth of the patient (col.

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2, ll. 17-29, col. 5, ll. 6-11). Reifman also teaches the proximity indicator includes a digital display (col. 7, ll. 24-26) that displays digits representing a relative proximity to the apical foramen as illustrated in fig. 3 and wherein the processor updates the proximity signal (col. 7, ll. 61-67) and the proximity indicator includes a haptic device 11. Reifman does not specifically teach the display displays digits representing a distance to the apical foramen in a unit of measure, however, does teach a numerical display (col. 2, ll. 51-55), therefore it would have been obvious to one having ordinary skill in the art to include a unit of measure to correspond to the numerical display to produce useable results. Reifman teaches the divider signal consists essentially of a single frequency (col. 6, ll. 1-2) and wherein generating a proximity signal includes executing an equation that correlates at least one signal comparison with a proximity of the dental instrument to the apical foramen col. 2, ll. 22-27). Reifman does not teach the processor demodulates the modified voltage signal to isolate the modified voltage signal from the electrical noise generated by the dental instrument. Masreliez teaches a processor which demodulates a signal to isolate the signal from the electrical noise generated by an instrument (col. 4, ll. 45-46). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Reifman in view of Masreliez in order to obtain the most accurate result.

14. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reifman et al. 6,425,875 (Reifman) in view of Masreliez 5,759,159 as applied to claim 8 above, and further in view of Farin et al. 5,267,997 (Farin).

15. Reifman in view of Masreliez does not teach the use of a low pass filter. Farin teaches the use of a low pass filter (col. 6, ll. 22-28). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Reifman in view of Masreliez further in view of Farin in order to filter out unwanted noise as taught by Farin (col. 6, ll. 22-28).

16. Claims 17 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reifman et al. 6,425,875 (Reifman) in view of Masreliez 5,759,159 as applied to claims 8 and 27 above, and further in view of Silver et al. 6,356,350 (Silver).

17. Reifman in view of Wilson does not teach the processor performs at least one of the following: a synchronous demodulation algorithm, a fast Fourier transform, a single frequency fast Fourier transform or a convolving algorithm to demodulate the modified voltage signal from electrical noise generated by the dental instrument. Silver teaches using a fast Fourier transform to demodulate a signal (col. 5, ll. 60-62). It would have been an obvious matter of design choice to use any known mathematical method to demodulate the signal in order to obtain the most accurate result.

Response to Arguments

18. Applicant's arguments with respect to claims 1-9, 12-22, 24, 26-28, 31-33, 36 and 47-71 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEIDI M. BASHAW whose telephone number is (571)270-3081. The examiner can normally be reached on Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris Rodriguez can be reached on 571-272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**Heidi Bashaw
Examiner
Art Unit 3732**

/HEIDI M BASHAW/
Examiner, Art Unit 3732

9/24/2008

**/John J Wilson/
Primary Examiner
Art Unit 3732**